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VOLUME XV

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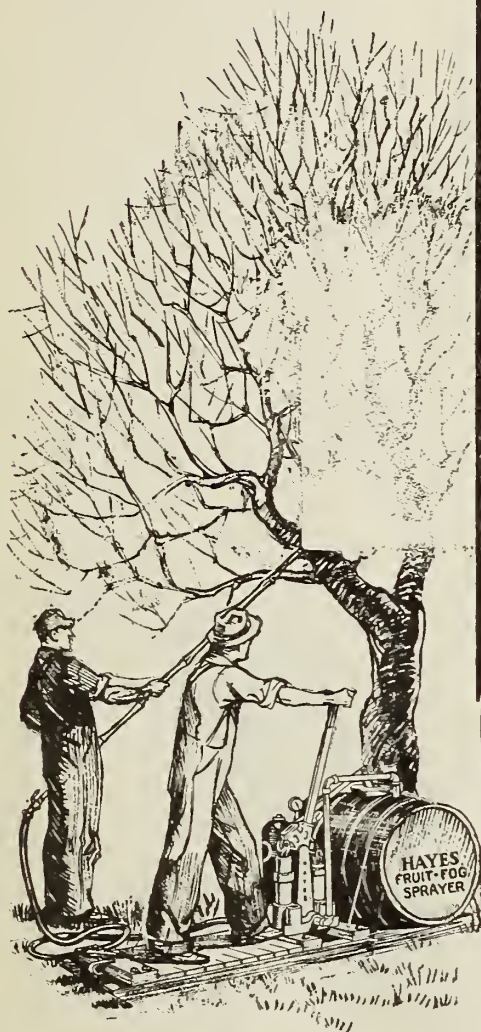
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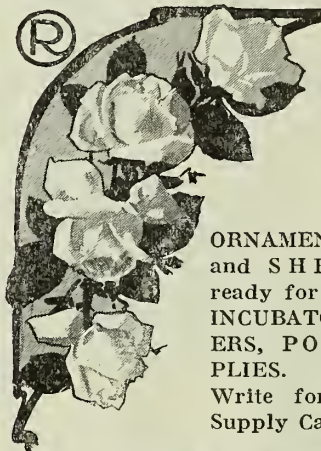
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The Pruning and Care of Young Apple Trees

Written for Better Fruit by An Experienced Orchardist

SO MUCH has been written upon the subject of the pruning of a young orchard that one wonders what possibly remains to be said upon that subject, but, as surely as the different methods of pruning are based somewhat upon theory, so surely will it remain undecided as to which of the different methods and theories are correct. Then, again, it is surprising to find how many orchardists, or rather people who own young orchards, there are who are so ignorant regarding the simplest principles of pruning, an example of which the writer recalls in looking over a young orchard, to see half inch to inch stubs left and carefully covered with walnut wax and, when asked why he left such long stubs, the owner said that was the way he was told to do it by one whom he thought knew. So, possibly, some of the points brought out in this little article may prove of value to the owner of a young orchard.

It is hardly necessary to state that the tree should be planted just as soon as possible in the spring and the bud placed from 2 to 4 inches under the surface of the ground, the whole tree slanted slightly to the prevailing wind. It is advisable not to cut the tree back immediately after planting as in certain sections the bud weevil is apt to make its appearance at this time. The weevil always climbs to the top of the tree and eats up the buds. The writer has sometimes headed newly set trees where there were often 6 to 8 weevils eating the buds from the top of a single tree. Incidentally, the weevil is very hard to control, the only satisfactory method of a great many tried is to fasten a cone of tin with the apex upward on the trunk of each tree.

Before the leaves start to open cut the tree back to a good bud 28 to 32 inches above the ground. Cut at an angle of 45 degrees and preferably to a bud on the windy side of the tree. Cut one-fourth inch above the bud as the trunk of the tree does not swell very much the first year and the wood dies back probably one-eighth inch; then the second year cut the trunk again close to the top limb and the wound will quickly heal over. If the tree is branched, cut off the lower limbs, but save some of the upper limbs if

one should be in a desirable place, as, if the limb should be removed, a bud might not force itself out at that place, but prune these limbs back rather hard. Sometimes in May after the trees have leafed out, rub off all shoots within 16 to 18 inches of the ground and, if all the buds come out above, possibly a few of these may be rubbed off. This is all the pruning for the first year.

Beginning the second year prune any time before the leaves start and cut off the top stub, if there be any, flush with the top limb. Leave 4 to 6 limbs because the more limbs left the fewer crotches there will be after the third pruning and, later, should the snow or a heavy load of fruit break off a limb, the tree will not be crippled as it otherwise would be were there only three limbs. Have the bottom limb 16 to 18 inches from the ground, thus spreading the head approximately a foot or more and let the limbs be divided equally in that distance. It is sometimes advisable to take out the top limb to open up the center with varieties that shoot up too straight, such as the Arkansas Black. Always take out the second

limbs, i. e., the ones just below the top, as before long this limb forms a perfect crotch with the top limb and is always the first to break in a deep snow. The writer has seen after a bad winter a whole row of trees where the second limb and only the second limb has split in every tree in the row. Prune to an outside bud and cut off one-sixteenth to one-eighth inch above the bud, quite near, but not too near as the bud may dry out and not start to grow. In pruning lumps off from the trunk cut close but not exactly up to the trunk, but to a little collar at the base of the limb, because when the cut is close to the tree and the tree swells it leaves a little hole in the trunk for water and disease to enter and if the cut is out from the tree the following year the trunk swells to the cut and grows over it. However, this is more important with the larger limbs than with the smaller, but never leave a stub. Cut the limbs back to about 10 inches of their growth, maybe 12 inches, if the tree makes a good growth, otherwise shorter. If the limbs are pruned quite short and there are not many limbs, the following year the forks will be too close to the trunk. Carry a can of thick white lead around and paint the top of the trunk and the larger wounds. White lead or red lead is more satisfactory than any of the waxes as the hard waxes all crack and split off when the tree swells. The latter part of May rub off some of the inside and superfluous limbs and the pruning for that year is done.

This brings us to the spring of the third year and the tree is a two-year-old. It is now necessary to choose between the two fundamental types of trees, the central leader or the open centered. There are certain advantages in both types, but on the whole the writer is inclined to a modified form of the central leader where the tree is started with a leader in the center and is opened up to suit the variety and the conditions of the locality. It is quite difficult to fill in a tree that is too open after it is allowed to bear fruit, but very easy to open up a tree that does not allow sufficient sunlight to color the fruit. An open centered tree is not as strong as the leader tree, is more susceptible to splitting and needs



Two year old tree pruned.



Illustrations showing three and four year old trees after being pruned. In the center of the four year old tree can be seen the natural tree brace which has just been started.

more bracing. Then there are so many varieties that open up as they get older and bear fruit, such as the Jonathan, Winter Banana, Spitzenburg and Ortley, that it is very advisable in dealing with these varieties to have plenty of limbs and not to have the tree too open. The third year prune off one-half to two-thirds of the new growth allowing one or two more limbs to be added to the system, but being careful of crotches, formed by two limbs coming from buds too near together on the older limb, also continuing the leader in the center. Prune usually to outside buds, except where there is considerable wind and in the case of a variety like the Jonathan when it is advisable to prune all limbs to the wind. Take the can of white lead around again and paint all large wounds. Be careful not to prune all the limbs the same height from the ground, thus making the top of the tree look as though it had been sheared and giving the whole tree a storied appearance. Should the tree be headed too high, or there being no limb in the trunk where the grower might desire one, often the insertion of a bud in August will start a limb the following spring. This bud will not always grow, but will frequently remain dormant for a season and sometimes start the following spring. By the end of this season we should have a fairly well shaped tree. The writer does not believe in summer pruning (heading back in the summer) a very young tree. The theory is that it is unnecessary to secure a long thin growth, and checking the flow of sap at the terminals makes the limbs and trunk larger on that account. This is very often true but we find that entirely checking the growth of the tree devitalizes it so much that in the long run it will not measure up in size with a tree that has been let alone in the summer time. Then again, this checking starts a tender growth at the terminals which usually grows later

in the fall and the wood does not ripen up as well as it should to enter the winter and the limbs are therefore more susceptible to winter killing. Summer pruning for fruit a year or two later is entirely a different matter, but the first few years we want only to get as strong and large a tree as possible.

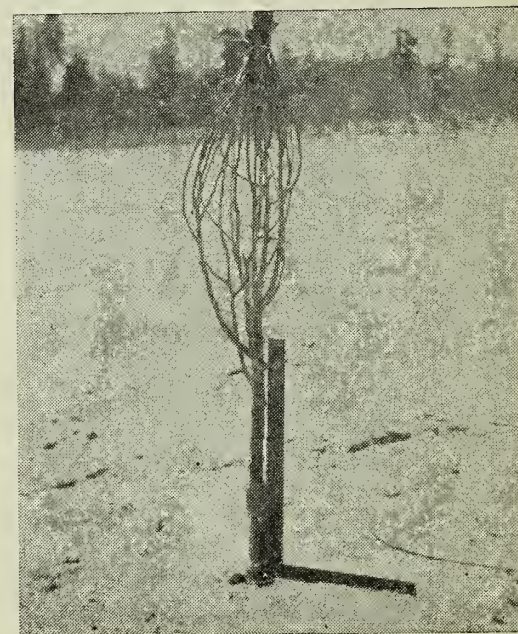
Our tree is now three years old. This year two new steps enter into the shaping of the tree, the addition of laterals and natural braces. We have not mentioned natural braces (the weaving together of two cross limbs) heretofore, as it is desirable to have them rather high up above the head of the tree, thus allowing less leverage upon the limb in question when the strain of a heavy load of fruit is upon it. The writer believes in being very generous in the use of the natural brace,—it may be somewhat of a nuisance to remove the water sprouts each year from the braces when the tree is young, but that is far preferable to having a limb split and ruining the shape of the tree. Again prune off one-half the new growth, opening up the leader in the center and allowing possibly one lateral to each main limb to come out radially from the center of the tree. Choose the laterals several buds below where the second year's growth is pruned off so as to eliminate the tendency to crotch and prune the laterals more severely than the upright limbs. From now on the grower will probably have ideas of his own as to the shaping of his trees and will need no more advice so we will here leave him for better or for worse.

Protecting Young Trees.

Not included in the category of pruning is the care of young trees where they are apt to be hurt by storms. Should they not be cared for the problem of pruning becomes a complicated one. In sections where deep snows and

silver thaws are likely to occur young trees should be staked and tied. Should the tying prove useful only once in four or five years, the saving of the trees that one year will justify the expense. The writer has tied up trees for several years, but only once during that time was there a very bad storm, then every tied-up tree was completely untouched while there was considerable breaking of limbs and trunks in orchards that were not protected. There need be no fear whatsoever that the limbs, no matter how tightly they may be gathered together, will not spring back to their original place when the cords are cut in the spring. Binding twine is best for this tying. For the one-year-old trees it is safer to stake each tree, driving the stake about a foot from the base of the trunk and slanting it slightly inwards,—then the branches are gathered tightly in two places and they are first tied to the trunk and the whole is then tied to the stake. This absolutely protects a young tree from any injury due to storms in winter.

When the tree has had two seasons growth, the trunk is usually strong enough to do away with the staking, but the branches are gathered in above the head as tightly as they can be drawn without breaking and then tied. They are tied again at the top and this gives great stiffness to the tree and eliminates any center where there can collect a ball of snow or ice. It is better for this work to be done by two persons, one to gather in and hold the limbs and the other to do the tying. After the third season the trees should be able to take care of themselves, though it is a simple protection to run one cord around the branches at about the middle of the tree and to draw in rather tightly. It might be thought that this is going to considerable trouble and expense to insure the safety of the trees, but the total cost for several years will not equal the damage a young orchard might receive during a single storm.



Young tree tied up to protect it from snow and sleet.

Smoke and Direct Radiation in Frost Protection

By Floyd D. Young, Meteorologist U. S. Weather Bureau

SMUDGING, or the creation of dense blankets of smoke over fields and orchards on frosty nights through the burning of damp straw or other material, has been practiced since the beginning of the Christian era. In his "Natural History", published A. D. 77, Pliny the Elder advised farmers of his day when frost threatened to "make bonfires in the fields and vineyards of cuttings or heaps of chaff, or else of weeds that have been rooted up; the smoke will act as a good preservative". The degree of faith in the efficacy of this method of protection that prevailed in Germany near the end of the 17th century is shown by the fact that smudging was compulsory in one part of that country.

Only comparatively recently have some orchardists come to believe that actual warming of the surface air is of greater importance than creating a smoke cover, and the belief is still held by many that the smoke and other products of combustion from the fires check the loss of heat from the ground and prevent a further fall in temperature.

In order to determine accurately just how effective the smoke cover is in diminishing the rate at which heat is lost to the sky, instruments for measuring the rate of nocturnal radiation were installed in the Pomona Valley, Cal., in the fall of 1918. Observations were made every half hour from sunset to sunrise during two clear nights when there was no firing, in order to find out whether there was much variation in the rate at which heat was radiated to the sky. These radiations, reduced to a common temperature basis, showed the rate of radiation to be relatively uniform throughout both these nights.

The 1918-19 frost season proved to be the most severe in years. Firing was general over the entire valley and was continued for from nine to ten hours on four different nights. Radiation observations were begun before the heaters were lighted, to obtain the rate at which heat was being lost to the clear sky, and were continued all night under a smoke cover that increased in density as the night progressed. Since the rate of radiation was fairly uniform during clear nights when there was no smoke cover, any decrease in the rate after the heaters were lighted could be attributed to the influence of the smoke.

As the smoke often remains near the ground, the first observations were made from the top of a fourteen-foot tower, at about the height of the tops of the trees in an orange grove, in order to find out whether the lower portion of the trees does not receive more benefit from diminished radiation than the top. (See figure 1.)

During the two nights on which observations were made from this tower, very little smoke rose above the top of the instrument shelter and the rate of radiation showed no appreciable decrease as a result of the firing.

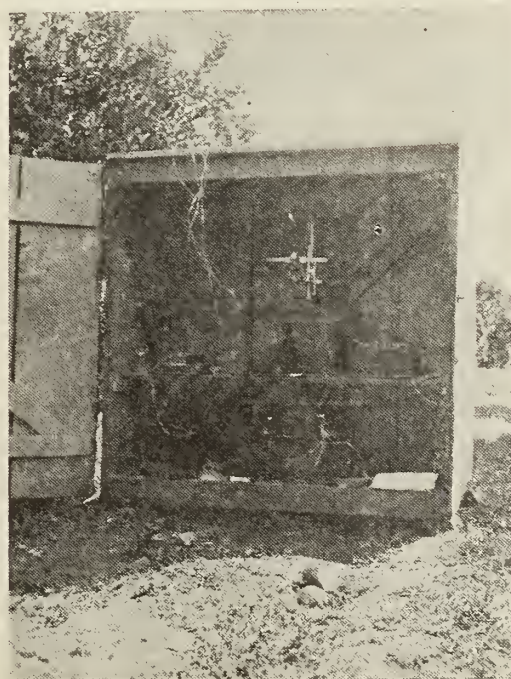
The radiation instruments were then moved to a location on the ground in a small open space in the same grove, and observations were made on two nights during which the smoke was probably as heavy as will ever be experienced anywhere. Despite this heavy smoke, the rate of radiation was diminished by



Tower shelter for radiation instruments. It was found that practically all the smoke remained below the top of the shelter and showed practically no influence on the radiation.

only about 10 per cent during any considerable period of time, although individual readings showed a decrease amounting to as much as 25 per cent. (See figure 2).

Additional observations of the same kind were made at Medford, Oregon, during the spring of 1920, outside and under a dense blanket of smoke produced by open lard-pail heaters. The average decrease in the rate of radia-



Radiation instruments in shelter on ground.

tion due to the smoke was 9 per cent, with an individual reading which showed a decrease of 26 per cent.

The rate at which heat is radiated from the ground decreases very rapidly as the temperature falls. As the orchard heaters are not lighted until the temperature has reached a comparatively low point, a reduction of even 25 per cent in the radiation at this time is not very important; in order to prevent damage through the use of the smoke cover alone, the rate of radiation would have to be cut down at least 80 per cent. It is evident that the smoke would be of far greater value in protection against frost damage if it were completely consumed in the heaters.

The smoke may often be of indirect benefit in preventing a too rapid thawing of frozen fruit or blossoms at sunrise, but from the data at hand it appears that neither in this connection nor in its influence in reducing the rate of radiation of heat to the sky, is damage from a moderately severe frost to be prevented by a smoke cover alone. When the lowest temperature during the night is only slightly below the danger point, a heavy smoke from smudge fires may lessen or prevent damage, but to combat a frost which would otherwise cause widespread damage, it is necessary to supply great quantities of heat to the surface air to replace that which has been lost by radiation to the sky. In most cases the straw or manure burned to create a smoke over the orchard would do more good if used for fertilizer, making the trees more vigorous and therefore better able to resist damage by low temperature.

Radiation From Heaters to Trees.

Some careful observers of orchard heating operations have noted for years that when heaters are placed in alternate rows between the trees, the greatest damage from low temperatures is always found in the rows in which no heaters are placed; in other words, "the dark rows are the cold rows." One fruit grower of Pomona, Cal., estimated he had fully 50 per cent more damage during the severe 1918-19 season in rows

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without heaters than in those in which the heaters were set.

This brought up the question as to the amount of benefit derived by the fruit and foliage from heat radiated directly from the fires, and steps were taken to find out exactly how important this radiated heat is in affording protection against frost damage.

When exposed to a clear sky, all substances steadily lose heat by radiation. Fruit and foliage exposed to the sky and also to the direct light of a burning orchard heater, will be losing heat by radiation to the sky and receiving heat by radiation from the heater. The amount of radiant heat received decreases very rapidly with increasing distance from the heater.

The simplest way to show the amount of radiant heat thrown off by an orchard heater is to note the distance from the heater at which it counterbalances the radiation to the sky.

Measurements of the rate at which heat is radiated from different types of orchard heaters, burning at different rates, were made by Professor H. H. Kimball, of the Weather Bureau. It was found that the radiation from a Scheu high-stack heater, burning at full capacity, if absorbed by the fruit and foliage of the tree, would be sufficient to offset the radiation to the sky up to a distance of 15 feet; if the lower section of the stack only was red hot, nocturnal cooling would be offset at a distance of about 10 feet. The radiation from a short-stack California heater, burning

at full rate, was sufficient to counterbalance outgoing radiation at a distance of about 8 feet.

With the amount of radiant heat received from an old style 5-quart open lard-pail heater at a distance of 10 feet considered as 100 per cent, other types of heaters radiate heat as shown below.

Heater	Rate of Burning	Radiation
Lard-pail	Full rate	100%
California (short-stack).....	Full rate	125%
Adamson (high-stack).....	Low rate	146%
Adamson (high-stack).....	Full rate	315%
Scheu (high-stack).....	Low rate	181%
Scheu (high-stack).....	Medium rate	369%
Scheu (high-stack).....	Full rate	400%

This table shows that heat radiated directly from the heater to the tree is of much greater importance with the high-stack heaters than is the case when other types are used. High-stack heaters should be placed in the orchard in such a position as to throw light on the greatest possible area of foliage.

The efficiency of an orchard heater is not determined by the amount of heat radiated directly from it. A large percentage of this radiant heat is lost directly to the sky without appreciable effect on the temperature of the air or of the plants. As radiant heat travels in straight lines and is completely absorbed or reflected by fruit and foliage, any fruit shaded from the heaters by leaves or branches can receive practically no direct benefit from the radiated heat. In the ideal orchard heater the heat units in the fuel would be entirely expended in raising the temperature of the air near the surface of the ground.

The O. A. C. Horticultural Show Attractive

THE horticultural show presented annually by the horticultural department of the Oregon Agricultural College was larger this fall than ever before and the general arrangement and quality of the exhibits drew favorable comment from professional horticulturists and the interested crowds which saw it.

The show was unique in character, presenting a high degree of finish and artistic decoration often lacking in shows and fairs. Festoons of cedar boughs, hanging fern baskets, and quantities of chrysanthemums were used in decorating the large gymnasium in which it was held. A covering of moss fresh from the woods offered an attractive setting for the exhibits on the display tables.

The most notable thing in the section given over to fruit was a collection of 200 varieties of pears which, according to Prof. Walter S. Brown, chief of the division of horticulture at the college, was the largest and most comprehensive shown in the United States up to the present time.

A very complete exhibit of nuts including varieties from the tropics drew much attention but the most popular display was a collection of sub-tropical fruits assemble by F. A. Gillette of La Verne, Cal. Plates of avocados, figs, guavas, olives and other sub-tropical fruits seldom seen in the northwest were new to many and received much attention from the visitors.

District displays from California, Oregon, Washington and British Columbia were shown, first award in this class going to Moore and Hartman of Wenatchee, Wash., and second to R. C. Woodward of Victoria, B. C.

The section devoted to the vegetable gardening phase of horticulture was arranged under the direction of Pro. A. G. Bouquet. This department had a large and complete display of vegetables, most of which came from Oregon and California. The high quality of these products was apparent even to the casual observer. A novel arrangement of exhibits on bracketed pannels was very effective in showing cauliflower, Swiss chard, celery and other bunch vegetables.

Another section of the show was composed of exhibits of canned goods, preserves, jells, jams and juices. Dried prunes and cherries bearing the labels of the new "Mistland" brand of the Oregon Grower's Co-operative association occupied a portion of this side of the room. Oregon and California canners occupied a large part of the space with their products.

Flowers from the college greenhouses filled the fourth section and vases of immense chrysanthemums neatly arranged on a green lawn of cedar foliage against a background of plants and flowers were admired by all who saw them.

A judging contest was carried on in connection with the show and a cash

prize of \$25 presented by C. I. Lewis, organization manager of the Oregon Grower's Co-operative Association, was distributed to the four students scoring highest in judging plate and box displays of apples and in the identification of varieties. Winners were W. B. Murray, Grants Pass, Ore., first; A. F. Gillette, La Verne Cal., second; R. H. Campbell, Amity, Ore., third; and H. L. Wilson, Hemet, Cal. In addition Mr. Murray as winner of the contest will have his name engraved on a silver loving cup which was presented to the show by A. B. Cordley, dean of the school of agriculture.

One of the chief benefits derived from the show is the training afforded students of horticulture in the preparation of exhibits but in addition to this the educational value of the show brings in many visitors from over the state.

Much of the success of the undertaking is attributed to the efforts of Prof. Walter S. Brown, chief of horticulture at the college, and his faculty staff consisting of C. E. Schuster, A. L. Peck, A. G. Bouquet, Henry Hartman, and E. H. Wiegand. The student committee was headed by E. L. Smith of Pasadena, Cal. as general manager assisted by C. E. Baker, Los Angeles, Cal.; W. B. Bollen, Portland, Ore.; R. H. Campbell, Amity, Ore.; A. F. Gillette, La Verne, Cal.; T. E. Hall, Yakima, Wash.; W. B. Hayes, Pasadena, Cal.; W. B. Murray, Grants Pass, Ore.; E. R. Shannahan, Dundee, Ore.; W. W. Weed, Beaverton, Ore.; H. L. Wilson, Hemet, Cal.; and R. C. Woodward, Victoria, B. C.

Ribbons were awarded the winners in the competitive exhibits of fruit and vegetables, C. I. Lewis acting as judge. Tiffan and Storz with fruit from the Oaco orchards at Amity, Ore., won first on three-tray displays of Grimes, Ortle, and Spitzenburg. They were also awarded first place on single tray exhibits of Yellow Newtown, Northern Spy, King, and a tray of Patrick Barry pears.

Many students took ribbons in the classes they entered and winners of first places were G. Cifre, single tray of Northern Spy; E. L. Smith, single plate of Clairgeau pears; E. H. Hesselstine, general plate display of walnuts; A. F. Gillette, Whittier supreme walnut; C. E. Baker, Placentia walnut. G. F. Bell won second on the Eureka walnut. A. F. Gillette was awarded first on a group display of almonds and plate exhibits of ne plus ultra, IXL, nonpareil and Texas prolific. M. Wharton, Garden Grove, Cal., was awarded first on Valencia oranges, Eureka lemons, Prolific walnuts, Eureka walnuts, Anaheim and Chinese Giant peppers.

Competition was keen in the vegetable section and winners of first awards were F. H. Hughson, Albany, Ore., on turnips and squash varieties; J. C. Leady, Beaverton, Ore., on cauliflower. F. B. Chase, Eugene, Ore.; H. C. McGinnis, Troutdale; and the Labish Meadows celery farm were winners in the celery classes. First award in the various classes of cabbage went to C. W. Kruse, Oswego, Ore.; D. P. Allen and George

Emker, Brownsmead, Ore.; and F. B. Chase, Eugene, Ore.

A. F. Gillette and the Aggeler and Musser company were winners in the sub-tropical entries.

Certificates of merit were awarded for the best exhibits of horticultural products as follows: the A. Rupert company of Portland, a display of canned goods, preserves, jams and jellies; Wadhams & Kerr of Portland, a display of canned goods and exhibit of Monopole Brand jams and jellies; Starr Products company of Portland; Knight Packing company of Portland; Phez company of Salem; and the Brownsville Canning company of Lebanon, Ore. California was also represented in the display of canned goods, the Taylor Tamale company of Los Angeles, the Curtis Corporation of Long Beach, and the Ocean Shore Canning company of Half Moon Bay sending attractive exhibits of their products.

Controlling the San Jose Scale

San Jose scale was discovered in this country in 1874 in San Jose County, California. It was probably introduced from China. Now it is found in nearly every fruit growing country of the world.

San Jose scale is an insect. The scale proper is a waxy secretion covering the soft yellow sac-like body of the insect beneath. Adult insects appear in May and the females mature and begin giving birth to living young during the latter part of June.

A single female may give birth to about 400 young, and as the life cycle covers but a few weeks, there may be several generations in a year. In this latitude there are usually four. It has been estimated that the progeny from a single female would amount to the enormous total of 1,608,040,240. Knock off 50 per cent for error and we still have a pretty good argument for spraying.

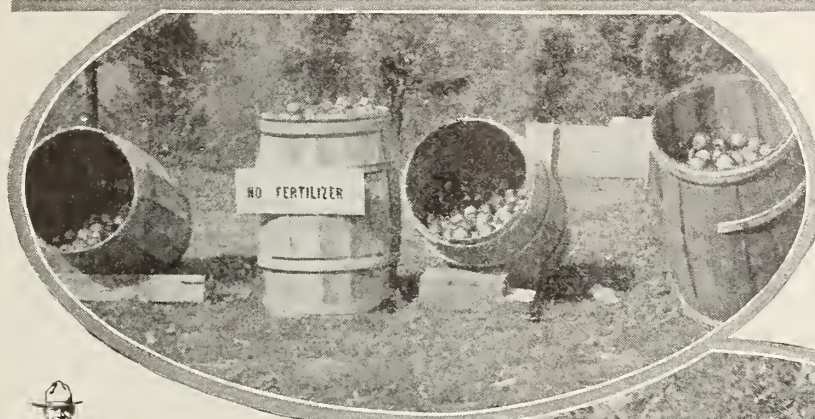
The principal means of the scale getting from your neighbor's orchard to yours are, birds, wind and on the bodies of other insects. It is spread from one district to another on nursery stock.

Control.—Through annual spraying with lime-sulphur solution testing 4 degrees in the tank. I might also add that the control is measured largely by the thoroughness. This spray may be applied in the fall after the leaves are down. In the winter, when the temperature is above freezing, or in the spring before the foliage appears. It is well to remember that the scale is no larger than the head of a pin; that the insect itself is well protected under the scale.

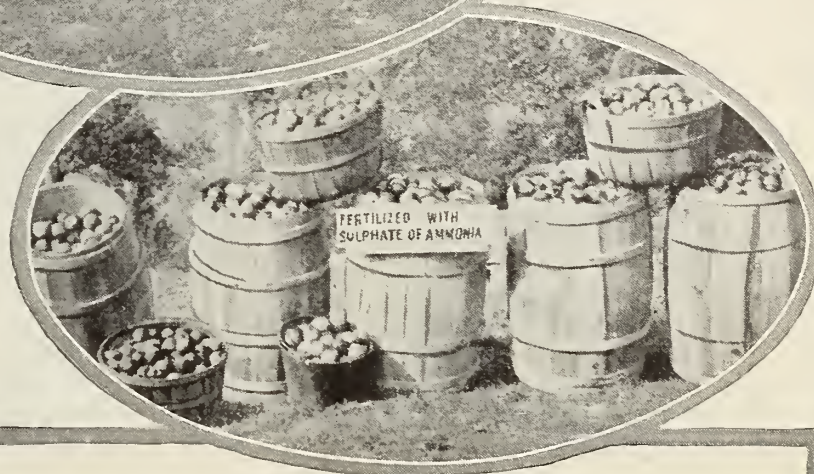
It is therefore necessary to hit each scale and not only hit them but thoroughly cover them. To do this requires powerful pumps, good nozzles and most of all, an experienced and determined man behind the gun, who can shoot straight and thoroughly cover the bark from the tips of the twigs to the surface of the ground.

TOP-DRESSING TALK No. 1

Why you should fertilize your orchard—



Upper photograph:—
Average yield from unfertilized tree, Ben Davis variety.



Lower photograph:—
Average yield from fertilized tree, Ben Davis variety.



Orchard Fertilization Experiment—1918.

Everett Craig, Mt. Healthy, Ohio

Variety: Ben Davis.

Variety: Rome Beauty. Average Yield per Tree

Fertilizer Treatment	Grades Figs refer to diameters of apples.			
	Below 2 1/4 in.	2 1/4-2 1/2 in.	Above 2 1/2 in.	Total Picked
No Fertilizer.	4.5 bu.	2.0 bu.	0.25 bu.	6.75 bu.
Sulph. of Ammonia, 4 lbs. per tree.....	7.0 bu.	7.5 bu.	2.5 bu.	17.0 bu.
Gain.....	2.5 bu.	5.5 bu.	2.25 bu.	10.25 bu.

Fertilizer Treatment	Grades Figs refer to diameters of apples.			
	Below 2 1/4 in.	2 1/4-2 1/2 in.	Above 2 1/2 in.	Total Picked
No Fertilizer.	0.375 bu.	1.0 bu.	5.0 bu.	6.375 bu.
Sulph. of Ammonia 4 lbs per tree...	0.25 bu.	1.0 bu.	13.5 bu.	14.75 bu.
Gain.....	0.125 bu. (less)	none.	8.5 bu.	8.375 bu.

These tables give a very clear idea as to the value of fertilization in orchards. Fruit growers should study the results carefully, and draw their own conclusions as to why they should fertilize their orchards.

Fertilize Your Orchard With

Arcadian Sulphate of Ammonia

Nitrogen (usually termed ammonia) is the most important fertilizer element in fruit production. It is ammonia that promotes the vigorous wood growth so necessary for the formation of fruit spurs and fruit buds.

Arcadian Sulphate of Ammonia applied about two or three weeks before blossom time (100 to 150 lbs. per acre) will invigorate the fruit buds and increase the amount of fruit set. It will also tend to overcome off-year bearing of the apple.

The failure of fruit to set and the early falling of fruit is often due entirely to nitrogen starvation. In some sections an early application of quickly available nitrogen has increased the yields of fruit from four to ten times.

Arcadian Sulphate of Ammonia is for sale by all the larger fertilizer companies or their agents.

Be sure you get *Arcadian*.

For information
as to application,
write Desk 9.

The *Barrett* Company Agricultural
Department

510 First National Bank Building, Berkeley, California

Western Nut Growers Discuss Their Problems

THE annual meeting of the Western Walnut Association held in Portland November 17 and 18 demonstrated that although the walnut growing industry received a severe set-back during the winter of 1919-1920, that growers are undismayed and that many new plantings will be made when the stock is obtainable. The lesson learned through the experience of the freeze last winter is that safety demands that walnuts be planted on the uplands rather than on the lowlands. In the Oregon walnut growing districts it was stated that very little winter injury developed in the upland sections and that the yield of nuts this year in many instances was the largest on record. It

was also shown by the data presented that filberts are extremely hardy and sustained little or no damage from the extremely low temperatures.

There were in attendance at the meeting about 100 nut growers from Oregon and the nearby states and many phases of value to the industry discussed. Among other important points brought out was the fact that experts in passing on the quality of nuts in the big Eastern markets have stated that the nuts grown in this section of the Pacific Coast are superior to those grown elsewhere and that there is an almost unlimited market for them provided that the cheap and inferior nuts from foreign countries can be kept from com-

peting with the home grown article. Even with this situation existing it was declared that one firm in the East had said that they could market annually 25,000,000 pounds of filberts of the quality grown in Oregon at profitable prices if they could get them.

Action taken at the meeting to aid the industry was the appointment of a committee to re-classify filbert varieties and with the view of obtaining a more satisfactory nomenclature for this nut on the Pacific Coast than now exists; the appointment of a legislative committee to take up the matter of a tariff on imported nuts and other matters and a resolution asking the Oregon State Highway Commission to change the name of the Capital Highway to the Walnut Highway and to plant walnut trees along it. The county commissioners of the counties through which the highway passes and the officials of the various towns it touches are requested by the resolution to co-operate toward this end.

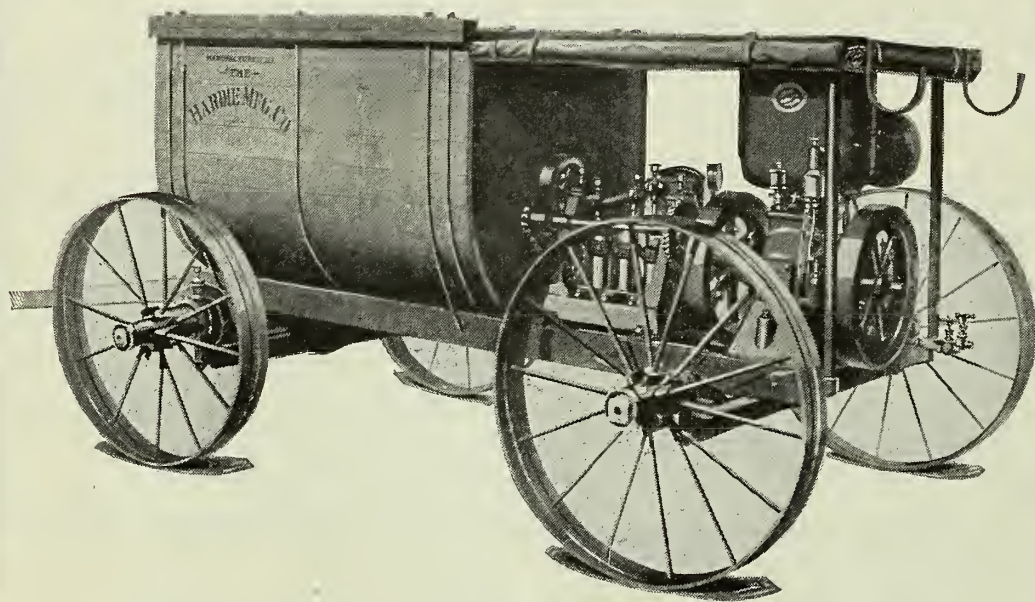
J. C. Cooper, of McMinnville, Oregon, the veteran president of the association refusing to longer serve in this capacity, H. A. Henneman, of Portland was elected to this office. The other officers chosen are: Ferd Groner, Hillsboro, vice-president for Oregon; A. A. Quarnberg, Vancouver, vice-president for Washington; Ben F. Doris, Eugene, Oregon, secretary-treasurer.

Those who delivered addresses to the convention were: Chas. Trunk, Dundee, Ore., "The Development of the Walnut Orchard"; A. M. Gray, Portland, Ore., "The Commercial Filbert Grove of the Pacific Northwest"; Knight Percy, Salem, Ore., "Chestnut Growing"; D. F. Fisher, Plant Pathologist U. S. Dept. of Agriculture, "Winter Injury to Fruit and Nut Trees"; Ferd Groner, Hillsboro, Ore., "Lessons From the December Freeze"; R. A. Booth, State Highway Commissioner, Eugene, Ore., "Nut Bearing Trees Along Highways"; C. I. Lewis, Organization Manager Oregon Growers' Co-operative Association, "Some Observations on California Nut Culture and Lessons We Here in the Northwest Can Learn Therefrom"; Ben F. Doris, Eugene, Ore., "Planting a Filbert Orchard"; A. A. Quarnberg, Vancouver, Wash., "European Investigations"; H. A. Henneman, Portland, Ore., "Filberts"; W. S. Brown, Chief Division Horticulture, Oregon Agricultural College.

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Ripening and Storing of Bartlett Pears

By J. R. Magness, Plant Physiologist, Horticultural and Pomological Investigations,
U. S. Bureau of Plant Industry

PERHAPS there is no major fruit crop grown in the Pacific Coast States that offers greater difficulty in the handling and marketing than does the Bartlett pear. This is due to its being a highly perishable fruit, to the fact that there is a wide variation in the keeping quality of fruit from various sections, and to a misunderstanding on the part of many handlers of the effect of such factors as time of picking, temperature at which stored, etc., on the keeping quality and dessert quality of the ripened fruit.

During the summer of 1919 a series of studies was made to determine the changes taking place in Bartlett pears as they develop on the tree and as they ripen after being picked. The effect of storing the fruit at different temperatures was also studied. Fruit was secured from typical orchards of the Sacramento River district, and from Suisun, Cal., from the Medford district, Oregon, and from Selah in the Yakima Valley, Washington. Pickings were made three weeks before the commercial season opened in each of these districts and at intervals thereafter until after the last commercial fruit had been removed from the trees.

Chemical analyses for sugar, acid, starch and dry matter were made when fruit of each picking was removed from the tree and again when this same fruit was full yellow ripe and in prime eating condition. The fruit was analyzed after being held in storage at 70, 45 and 30 degrees F.

It was found that there is a progressive increase in the sugar content of the fruit from early summer until after the end of the commercial season. Between the time of the first and of the last commercial pickings the sugar increased from an average of about 6 per cent to an average of about 8 per cent of the weight of the fruit. Between the time of picking and the time the pears are full yellow ripe there is a further increase in sugar due apparently to the change of starch and similar materials into sugar. Early picked pears, which contained about 6 per cent of sugar when first taken from the trees, contained about 8 per cent when soft ripe, and pears picked toward the end of the picking season and containing about 8 per cent sugar when removed from the tree contained about 10 per cent when full yellow ripe. It is thus apparent that to obtain the fruit richest in sugar it should be left on the tree as long as possible.

The total amount of sugar found in the fruit at the various stages of development was very nearly the same in pears from the different regions studied. This did not hold true for acids, however, as a considerably greater amount of acid was found in the northern grown fruit. Since acid and sugar are equally important factors in determining the flavor of the fruit, the greater amount of acid in the northern fruit probably accounts for the idea preva-

lent in pear trade circles that the California pears contain more sugar.

If the pears were held from the time of picking until soft ripe at ordinary temperature, rather than in cold storage, there was an increase in the amount of acid in the fruit during that time. Pears ripened at cold storage temperatures, however, contained about the same amount of acid when ripe that they did at the time of removing from the tree. There was about 1 per cent more sugar in the fruit ripened at 70 degrees than in that ripened in cold storage at 40 degrees.

Fruit ripened at 70 degrees was richer and better flavored than that ripened in cold storage. Fruit held at 30 degrees for two to three months, then taken out while still hard green and ripened at a temperature of 70 degrees, was richer in sugar and much higher in quality than that held until ripe at temperatures of 40 to 45 degrees.

Cold Storage Temperatures for Bartlett Pears.

There is a widespread belief among handlers of Bartlett pears, particularly in California, that this fruit, when put in cold storage, should be held at temperatures of 35 degrees to 40 degrees, or even higher. A careful study of the response of the fruit under different temperatures has shown this belief to have no foundation. Pears stored at 40 degrees, if put in storage as soon as picked, will last from three to six weeks, depending upon the degree of ripeness at the time of picking and the locality in which they are grown. If allowed to ripen at this temperature they will be lower in sugar and of poorer quality than if handled in any other way.

Storing at about 30 degrees gave by far the best results for Bartlett pears. Fruit picked while still hard and green and held at this temperature from six weeks to three and one-half months was to all appearances in this condition when removed from storage and required five to six days after placing in a room at 70 degrees before it was in prime eating condition. The quality of this fruit when ripe was much higher than that of fruit stored until ripe at 40 degrees. Furthermore, the period that it is possible to hold the fruit is much longer.

As the Bartlett pear acreage on the Pacific Coast increases, the season, both for fresh shipping and cannery or drying trade, must be lengthened. Cold storage must be utilized more and more. If the following rules for storage are closely adhered to, a product of excellent dessert quality, which may be stored for a considerable period, will be obtained.

1. Leave the fruit on the tree until it has attained a high sugar content. This is not always possible for fruit intended for fresh shipment, but for canning or drying it is especially important.

2. Remove the fruit to cold storage

at once after picking from the tree. Every day at high temperatures after the fruit is picked will shorten its storage life very considerably.

3. Cool the fruit to 30 degrees as quickly as possible. Fruit does not receive the benefit of the low temperatures until it is actually at those temperatures. Use a pre-cooling room where available to rapidly cool the fruit to the refrigerating temperature.

4. Hold the fruit at 30 degrees. A few degrees below this temperature the fruit is liable to injury and a few degrees above will shorten very considerably the time it is possible to hold the fruit.

5. When the fruit is desired for use, remove it from cold storage and allow it to ripen at temperatures of 60 to 70 degrees. This will give a higher quality produce than will storing the fruit until ripe at temperatures of 35 to 40 degrees.

Bartlett pears, picked when well matured but while still hard green and handled according to these suggestions, will readily last two to three months in storage, and in many cases may even exceed this time very considerably.

The data upon which this article is based and a more complete discussion of the results are given in a paper entitled "Investigations in the Ripening and Storage of Bartlett Pears," Journal of Agriculture, Research, Vol. 19, No. 10, August 16, 1920.

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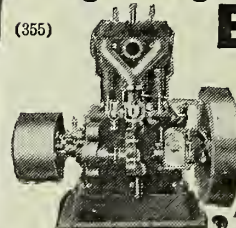
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Plenty of Potash

AFTER five years of Potash famine there is now plenty of Potash to be had at prices that will permit it to be used at a good profit.

When Potash in mixed fertilizers was sold at five dollars per unit, everybody exclaimed that the price was "prohibitive". This was a state of mind. As a matter of fact, when the records of long continued experiments east, south, and west, were carefully gone over it was found that there were plenty of cases where the crop increase from the use of Potash on corn, wheat, oats, cotton, tobacco, potatoes, vegetables and fruit returned over five dollars per unit, even valuing the crops at prices current before 1914.

Now prices of Potash are less than one-half of these "prohibitive prices" and prices of farm products are still high enough to make the purchase of the five to ten per cent. Potash fertilizers a very profitable investment when yields alone are considered.

But this is not all. The shipping and keeping quality of many of our truck, fruit and special crops has suffered from lack of Potash.

Plant diseases have increased for the same reason.

Our best lands have been overworked to the limit and need restoration.

The fertilizer manufacturer who really has the foresight to understand that he serves his own and his customers' interest best by

furnishing what his community really needs will return to the formulas that were found most profitable for his community before the Potash famine upset things. Indeed this is putting the case mildly, for provision should be made not only to restore the old high Potash formulas, but to use additional Potash to restore the drain on the soil during the past five years.

We never advised the use of Potash on soils where we had reason to believe it would not prove profitable, and never shall do so.

There is not a single crop on which Potash has not been found profitable on many types of soil.

In the readjustment period when farmers must use every means to assure success it is of the utmost importance that they should not be turned aside in their efforts to buy fertilizers with a reasonable (five to ten) per cent. of Potash.

Potash Pays

and after five years of Potash famine it will pay better than ever.

It takes time to produce and ship Potash and large stocks are not carried at Potash works.

Therefore it is imperative that you notify your dealer at once what brands of fertilizer you will require and that you should not be induced to change your order on any claim that the right kind of goods cannot be secured. Stick to it and you can get what you know you want.

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Orchards of England Show Heavy Decrease

SOME 10,000 acres in top fruit alone (apples, pears, plums, cherries, etc.) will be required to be planted in England to bring the area of productive fruit plantations and orchards back to the pre-war acreage, according to the Ministry of Agriculture. The estimated acreage, based on the returns for the years 1913 and 1919, were 243,609 and 232,378, respectively, showing a decrease of 11,231 acres. Apples went from 160,357 acres to 147,401, a decrease of 12,956 acres.

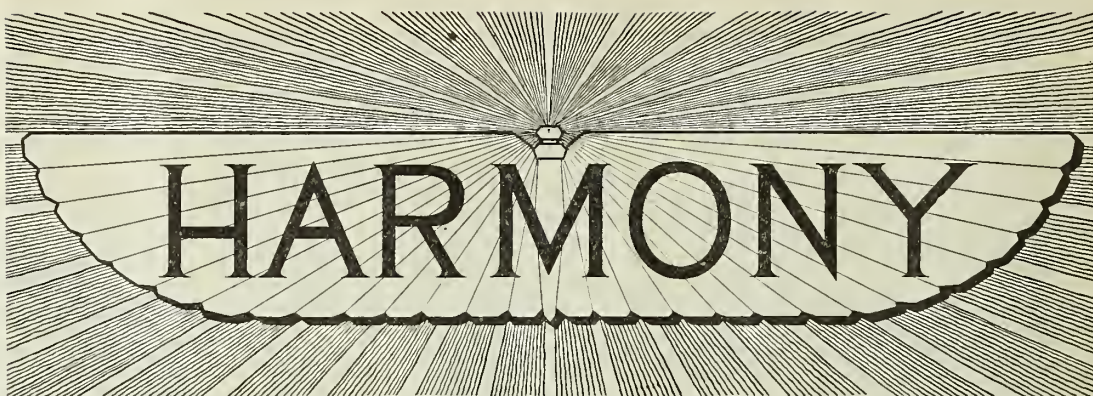
In soft fruits there was in the same period a reduction of 18,139 acres (from 76,857 to 58,718 acres). The Ministry of Agriculture has not yet tabulated returns relating to top fruit for 1920, but for soft fruit (strawberries, raspberries and currants) the statistics show that the downward movement of war years has been arrested and that the area under such fruit has been extended from 58,718 in 1919 to 60,318 acres for 1920. There remains, however, a shortage of 16,539 acres for soft fruit as compared with the 1913 acreage.

Owing to the fact that supplies of fruit trees are short, it is not likely that any progress can be made in the immediate future, although land is available for the extension of fruit planting. In view of these facts, American nursery stock should find a good market in Great Britain. English fruit growers usually plant by the middle of October. In early, dry seasons planting may be done sooner, because the wood is ripe; in wet seasons it is done not later than the end of November. The Ministry of Agriculture is taking considerable interest in the question of fruit tree planting on small holdings and has already made some arrangements for the supply of a limited number of trees during this season, and in the autumn of 1921.

Fall and Spring Tree Planting

While some authorities advise planting fruit trees in the spring many others are of the opinion that it is much better to plant in the fall. In fact horticulturists of wide experience state that trees properly planted in the fall will in a few years show a more sturdy growth than those planted the previous spring, and that some varieties of trees such as the cherry get a much better start if planted in the fall. In planting cherry trees they should not be set in clay soil that will hold water. In fact an important point in planting cherry trees is to place them on a slope that will give them good drainage and sufficient elevation to protect them from frost.

In planting in the fall the work should commence as soon as dormant trees can be obtained and can be continued until the soil commences to freeze. The planting, however, should not be done when the ground is too wet to be well packed around the roots.



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Spraying With Bordeaux

By Leroy Childs, Entomologist, Hood River Experiment Station

Apple tree anthracnose is causing more damage in apple orchards of Oregon than any other disease. In order to effectively combat this disease, growers must be more vigilant than they have been in the past. The Bordeaux spray should be applied to every orchard, and to be effective it must go on as soon as possible. Every grower should arrange his work so that the spray machine will follow up the picking as fast as the fruit is removed. Don't plan to do this, but do it. Early rains may have caused infection to take place, but this is only a fraction of what will follow if the spray is not applied. The approved way of mixing Bordeaux follows:

Manufacture: Use wooden containers for dissolving the bluestone formula: Six pounds bluestone, 6 pounds lime (stone of best grade), 50 gallons of water.

Stock solution: Take a 50-gallon barrel of water and suspend near the top of the water a grain sack containing 50 pounds of bluestone, it will dissolve in about an hour. Take 50 gallons of quick lime and slack carefully, constantly stirring, adding water as needed to prevent it from becoming dry and burning. When thoroughly slackened add water to make 50 gallons. These stock solutions then contain 1 pound each of the original material to 1 gallon of water.

Method: We have been placing the materials direct into the tank diluted with water, but the following procedure is believed to give a better mixture. It is as follows: (Use the "1-pound to the gallon stock solution" mentioned above). 1. Take 6 gallons of the copper sulphate solution and add 19 gallons of water. 2. Stir up the stock solution of the milk of lime and take 6 gallons and add 19 gallons of water. Pour together slowly into another barrel (it takes two men to do this in order that the amounts may be kept in equal proportions) and stir thoroughly. It will be found more convenient to prepare the two solutions on an elevated platform and run them simultaneously from the dilution tanks into the spray tank. Pour the mixture into the spray tank, start the agitator and fill with water. These proportions may be mixed in larger units, but remember to keep the proportions the same.

Use plenty of material while spraying and be sure to cover the large limbs thoroughly. Bordeaux shows up nicely on the tree and it is very easy to note whether the spraying is being done well or not.

TREES AND SHRUBS



Fruit trees budded from bearing orchards. Apple, Pear, Cherry, Peach, Plum, Prune, Apricot, Quince, Grape Vines, Shrubbery, Plants, Raspberries, Blackberries, Logans, Dewberries, Asparagus, Rhubarb, Flowering Shrubs, Roses, Vines, Hedge, Nut and Shade Trees. Carriage paid. Satisfaction guaranteed.

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makes root-penetration easy
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and pays a heavy return on the investment through increased yields.

Ask your dealer for Du Pont Dynamite and Blasting Accessories. He will be glad to get them for you.

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Tree Surgery.

Considering the price and the difficulty in securing nursery stock to replace trees that have been injured, tree surgery is becoming a very important factor. In calling attention to this fact experts connected with the United States Agricultural Department state that up to the present time tree-repair work has not received the recognition and approval from tree owners that it deserves. Continuing, these experts say:

"This may be due at times to unfavorable experiences with dishonest or ignorant tree surgeons, at other times to the reluctance of the owners to spend much money in preserving their trees, or from their ignorance of the benefits that may result when tree-repair work is properly done.

"Reliable tree surgeons are doing much in a practical way to educate the public as to the benefits of tree-repair work. A few states have laws regulating tree-repair work on a commercial basis.

"Tree owners are urged to remember that the necessity for tree-repair work 15 or 20 years hence may be reduced materially by promptly attending to the fresh injuries of today.

"Most persons can, at least with a very little preliminary practice on the simpler types of work, undertake ordinary tree surgery provided they are familiar with the use of a gouge and mallet, a saw and a paint brush. A steady head and ability to climb will be necessary for work in the top of the tree.

"A badly diseased or injured tree should be removed and replaced by a healthy one unless there is some very special reason for trying to preserve the tree.

"Two axioms for tree-repair work that should be borne in mind constantly are: That prompt treatment of freshly made wounds is the surest and most economical method of preventing disease and decay in the future, and that all wounds made in tree surgery should be cleaned, sterilized and protected from infection just as thoroughly as in animal surgery, and for the same reasons."

The orchardist should always bear in mind that his trees are his stock in trade; his producing element in other words; that it takes years to bring them into bearing on a paying basis and that watchful care at the proper time will avoid a loss that cannot be made up in after years. Where the injury is slight it may be taken care of by the orchardist himself, but bad cases require the attention of a trained man in the profession, and it pays to have expert advice.

The Nut Growing Industry.

Due to a large extent to the thorough investigations made by government and state experts and the experience of growers this year it is shown that it will not be necessary to call a halt in the rapidly growing walnut industry in the Northwest on account of winter injury which was a more or less predominant feeling among growers last spring. These investigations show that the greatest injury was sustained in districts where the sites and soils were not best adapted to the growing of walnuts and that the trees most easily affected were those that were devitalized. Another feature is that damaging temperatures such as visited the Northwest during the past winter are of rare occurrence and are part of the hazards of growing nuts and fruits.

The recovery of trees in many orchards and the fact that walnuts on the uplands were very little injured and bore large crops this year coupled with the experience growers gained from the freeze generally has put new life into the industry rather than injured its advancement. The knowledge also that the demand for nuts grown on the Pacific Coast leads all others in the big markets is inducing many to plant new orchards while a number of those already in the business are contemplating enlarging their acreage. In fact with 10,000 to 12,000 acres of walnuts and filberts planted in the Northwest nut growing is taking a prominent place with the other orchard enterprises of this region, and time only is necessary to see the annual tonnage assume large proportions.

Bulge or Flat Pack.

The attempt of the railroads entering the Florida fruit districts to have the bulge pack abolished is commented on by the Fruit trade Journal as follows:

"Undoubtedly the sentiment of growers and the tendency of the present is toward the bulge pack. By its adoption less cars will be required to move the crop than otherwise; because more fruit can be put in each box than in the package which the Atlantic Coast Line Railroad seems to favor. Its use will also mean less decay in normal times inasmuch as the fruits do not shift or rub against each other in a tightly packed box as in the case in a flat packed container. Not even those who favor the latter package can deny that after citrus fruits are packed a few days, what at loading time was a flat pack becomes a slack pack and presents that appearance at destination as a car of oranges from Florida is usually six or seven days in transit. What is called a 'bulge pack' seems like an overfilled box at loading time, but after being a week or so in transit it proves to be nothing more than a box of full measure. The vibration of the car during its trip to northern markets reduces the bulge to merely full measure and that is what buyers expect. If they fail to get it, the growers will have to accept a reduced price for their fruit. It is not difficult to see that a

flat pack means a slack box, or an improperly filled one at points of destination. The jobber who is a connecting link between the producer and consumer, dislikes purchasing a slack packed box of fruit because such a package when turned over to the express man, or the truckman, will not reach the consumer in good condition as a result of the shifting of the fruit around in the box. Nearly all growers, jobbers and leading receivers share this view. Upon the necessity of reducing the damage to Florida citrus fruits in transit and making the problem of transportation as easy for the Atlantic Coast Line Railroad and other carriers as possible, there is general concurrence, but we doubt if the general use of the flat pack will bring about this desired result, or be conducive to the permanent good of the citrus industry."

At a meeting of the Florida citrus growers held at Orlando, in conference with the railroad officials so many arguments were brought to bear for the retention of the bulge pack that it is believed now that there will be no further objections to it. This is as it should be, as years of experience have shown that it insures a satisfactory box package to both dealer and consumer.

Spotted Apples.

Expert investigation into the cause of the spotting of apples, especially of the Newtown variety this fall, has resulted in the decision that either the August bordeaux must be eliminated or some other agent than copper sulphate must be used, says the Hood River Glacier. Contrary to the persistent conviction of some ranchers, the tiny red spots that covered a number of their Newtowns this fall are not the result of scab, but have been definitely traced to a combination of two causes, the unusually wet season and the copper sulphate in the bordeaux spray. Leroy Childs, of the Hood River Experiment Station, says there can no longer be any doubt about this, for it is now recognized that spotting to a lighter degree takes place under adverse weather conditions even in orchards in which bordeaux had not been applied in August.

The spotting is explained by Professor H. P. Barss, of the O. A. C. Experiment Station, who says that the rain and copper together had caused a drying out of the lenticles of the apples, with an eventual breaking down of the tissues. Wherever this breakdown of the tissues occurred a red spot developed. The reason why the apples in some orchards appeared to be more seriously damaged than in others is explained by the relative strength of the copper sulphate in the spray used.

Filbert Propagation.

Time and cost of getting filbert stock for new plantings can be saved by layering the shoots that arise from the base of the tree during the first summer. Well-rooted plants have been obtained the first growing season in trials at the Oregon Agricultural College and

are ready for setting in the orchard the next year. This is a saving of an entire year over present practices, from the beginning of propagation till the stock is ready for the orchard.

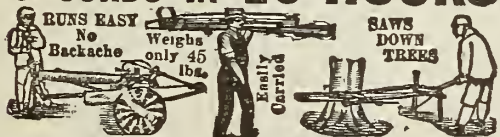
Gassing the Peach Tree Borer

The result of what is known as the para-dichlorobenzene treatment for the eradication of the peach-tree borer lead experts of the United States Department of Agriculture to believe that a practical means has finally been found of ridding orchards of this disastrously destructive pest. Previously the only effective method of fighting the borer was by removing the soil around the base of the tree and digging the grubs out of their galleries with a knife. It is estimated that the borers have done \$6,000,000 damage a year than that \$2,000,000 a year has been spent fighting them.

The para-dichlorobenzene method was first used extensively by orchardists in 1919. It consists in sprinkling fine crystals of the insecticide on the soil around the base of the infected tree and covering with earth to hold the gas. The substance is highly volatile and forms gas when the soil is between 74° and 80° F. This gas is five times heavier than air and sinks down through the soil. It is highly effective against the borer; and a pound of the insecticide, costing not more than 25 cents, is sufficient for 8 or 10 trees. The labor is scarcely one-third of that formerly required. The saving therefore is great.

This year the para-dichlorobenzene process has been used extensively in the Georgia peach belt, some localities buying as high as 50,000 pounds and large individual growers as high as 2 tons each. Growers declare that it is one of the greatest accomplishments in the history of the department, comparable to the self-boiled lime-sulphur treatment for control of brown rot and scab of the peach.

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1 lb., 48c; 2 lbs., 90c; 5 lbs., \$2.15;
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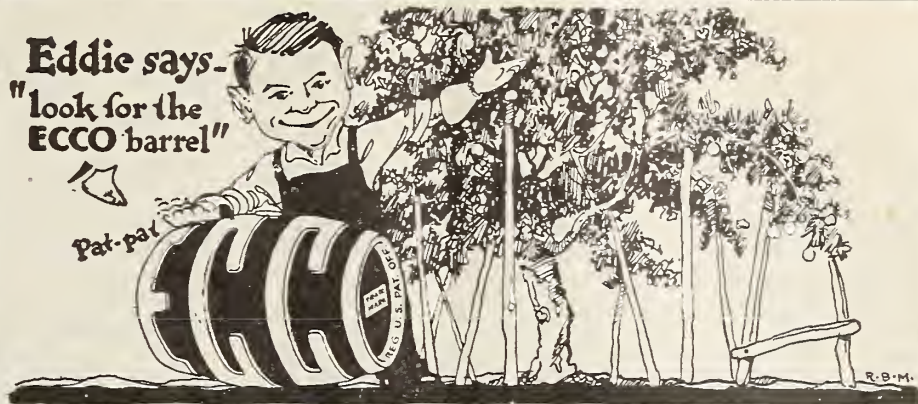
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Preparing Soil for Strawberries

In starting a strawberry patch one of the most important features for the prospective grower to remember is to have the soil in the right condition before setting the plants. The preparation of the soil for strawberries should usually begin a year or two before the plants are to be set, unless they are to be set in soil which has received the proper cultivation in growing other crops. Newly plowed sod land should not be used. The grass roots often prove objectionable and there is also the possibility of injury to the plants

from insects. If the soil is deficient in humus a green manure crop should be grown, such as clover or some other legume, or stable manure where available should be applied.

Setting the plants so that the crowns are even with the surface of the ground after the soil has been packed about the roots, and making the soil very firm about the plant are important. If the soil is not properly firmed about the roots, air gets to them and they are likely to dry out, resulting in a feeble growth or none at all.

In localities subject to late spring frost a site for strawberries should be

somewhat elevated, as cold air settles in low places and frosts occur there more frequently than on the elevated spots. Strawberries thrive best on soil which is naturally moist, but not wet. Plants on wet soil usually make very little growth in the summer and are likely to be killed when the ground freezes in the winter. Therefore the site chosen for strawberries should be well drained. Ordinarily a site having a gradual rather than a steep slope should be selected. By choosing different slopes it is possible to vary the period of ripening several days, as the berries having a southern exposure



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Make a Healthy, Productive Flock

POULTRY feeds must contain the proper ingredients, correctly blended and accurately balanced, to produce maximum results. That is why every comparative test proves OLYMPIC Poultry Feeds to be without either equal or superior.

THE PORTLAND FLOURING MILLS CO.,

Sebastopol, Cal., Sept. 22, 1920

Gentlemen:

I have checked up my egg record for the first three weeks of September, during which time I used your OLYMPIC SCRATCH FEED and OLYMPIC EGG MASH, and I find my flock showed a remarkable increase, the average of the last three days of the test over the first three showing 137 1/3 eggs per day increase, or 70% gain. My hens are also laying the largest eggs I have ever had, weighing over 26 ounces to the dozen. The pullet eggs went to 19 and 22 ounces on the OLYMPIC feeds. This I call remarkable.

I have been breeding for forty-five years and exhibiting for thirty-five years. I am delighted with your special molt and spring laying mash.

Enclosed find my full egg record for the twenty days, September 1st to 20th.

Yours very truly,

WM. BACON.



Dried Buttermilk

The drying of buttermilk for the various OLYMPIC Feeds, is proven the only practical method of introducing this most valuable ingredient into prepared feed. It does not become rancid when shipped or stored, nor lose any of its desirable qualities. The water has simply been removed, leaving the Buttermilk in highly concentrated form.

OLYMPIC Scratch Feeds

BABY CHICK SCRATCH consists of small, uniformly ground grains suited for the critical first three weeks' feeding.

GROWING CHICK SCRATCH—Of slightly larger grains for the youngsters up to 8 or 9 weeks of age.

SCRATCH FEED—For full grown chickens. Properly balanced proportions of Wheat, Cracked Corn, Kafir Corn, Milo Maize, Hulled Barley, and Oats, Buckwheat and Sunflower Seed.

CRATE FATTENER tears down the muscles and builds up the flesh; making the meat whiter, sweeter and more tender in the shortest possible time.

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OLYMPIC Dried Buttermilk Feeds

DRIED BUTTERMILK in the following feeds not only supplies its share of nutrition, but the lactic acid multiplies the digestive and assimilative properties of all other ingredients contained therein.

CHICK MASH is a body builder and feather grower. It eliminates the dangers of White Diarrhoea or bowel trouble.

EGG MASH is the egg-making feed and tonic for health and strength. It increases laying to a greater extent, over a longer period and with 20 per cent less feed consumed.



will ripen earlier than those located on a cooler northern slope.

Strawberries not only have a wide climatic adaptation but may be grown successfully upon almost any type of soil, from coarse sand to heavy clay, provided it is well supplied with moisture and at the same time well drained. When early fruit is desired sandy soil is often chosen, since the berries ripen somewhat earlier than on clay soil.

Pruning the Grape

In pruning the grape some successful vineyardists do not prune at all until the latter part of winter or early spring. In this case the pruning is done so as to leave only the buds wanted to bear fruit for the coming season. Grape vines, however, may be safely trimmed any time between the falling of the leaves in the fall and the beginning of sap flow in the spring.

In general practice the pruning of grape vines is usually commenced as soon as the leaves drop in the fall. If the wood is to be used in starting new vines, it is best to cut it from the vines, before freezing weather comes. When pruning in the fall or during the winter, the vines should not be cut back to the bud or buds that are wanted for fruit.

A few weeks before the buds start the vines should be gone over and the extra buds cut off. The second pruning should be done before the cold weather is over for if put off too long the sap will ooze from the wound and injure the vines. Should the vines be pruned in the fall down to the buds wanted for fruit, some of them might be winter-killed and the amount of fruit expected cut short.

If vines are laid down and protected during the winter, the pruning may be all done before they are laid down in the fall.

Tractor Depreciation

Many farmers look upon the tractor proposition with disfavor because of a mistaken idea of excessive depreciation, says a writer in discussing the value of the tractor. Tractor depreciation is figured at 20 per cent per year, while the average depreciation upon draft horses will not exceed 10 per cent.

A standard rate of depreciation cannot be determined, for the care or abuse which a tractor gets is the one determining factor, and matters of care are purely individual.

We have known of many tractors which went into the scrap heap at the end of three years. But there are just as many and more which have kept on year after year for eight, ten or twelve years. When sold, the depreciation of all was figured alike. When they got into the hands of users, depreciation became a personal problem, and one farmer had to charge off more than 30 per cent a year, while his neighbor charged off only 10 per cent.

Investigation of the 30 per cent class will invariably show that the owner knew very little about the care of his machine; that he changed the oil when

he thought of it and that his tractor stood out in the open most of the time. This fresh air treatment has been found quite successful for humans suffering from tuberculosis, but it has never been known to add to the life of a piece of farm machinery.

On the other hand, the same farmer will spend an hour or more each day keeping his horses fit. Metal and horse-flesh are so dissimilar that he fails to recognize the tractor's need of intelligent care, and when it fails he blames the dealer and the maker for his loss.

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"—and you'd be surprised"

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Standard apple boxes, crates and cases of selected material, carefully constructed.

It will pay you to send for our prices. Our large and complete stock enables us to make prompt shipment.

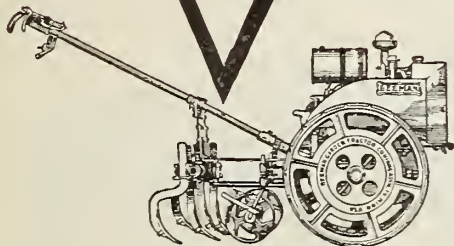
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The Beeman Garden Tractor

Will also do anything that a four-horse-power stationary gasoline engine will do.

Ideal for the rapid cultivation of berries.

A necessity for any fruit grower.

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OF PORTLAND, OREGON
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OF THE ROCKY MOUNTAINS

Now, if you go over to his neighbor's place, you will find the reason for his success just as apparent. His tractor is clean, the oil is fresh, bearings are tight and when it isn't at work he keeps it in a weatherproof shed or puts a cover over it to keep out the rain. His horses were profitable and his tractor is even more profitable.

Why Trees Fail to Grow

The reason why trees fail to grow is usually blamed on the nurseryman, but more often there is some other cause. Trees are subject to more or less hardship between the time they are standing in the nursery rows and the time they are again set in the ground. Tracing the history of the tree through the several steps in its digging and transplanting, we find that it may have been injured or broken in digging. After removal from the ground it may have received more drying wind and hot sun than was good for it. The tree may have been packed too wet or too dry, or the materials used may have given off heat, to the injury of the tree. In being transported it may have been placed against hot pipes or against some other heated object. It may have been delayed in transit, or the purchaser may have neglected them on their arrival, exposing them to the sun and wind.

The greatest cause of loss to trees, however, is stated to be in the work of planting. When trees are dug nurserymen frequently leave about three-quarters of the roots in the soil. The tops, therefore, must be cut back hard. In planting the young trees they should not be set in soil that is too wet or too dry. If the soil is dry water should be used in planting, a bucketful or more when the hole is three-quarters of the way filled up with soil. Most important of all, the soil should be tightly packed around the roots by hand. Tight packing is one of the essential things to successful tree planting.

The Honey Bee.

There is no creature by which man has surrounded himself that seems so much like a product of civilization, so much like the result of development on special lines and in special fields, as the honey bee. Indeed, a colony of bees, with their neatness and love of order, their division of labor, their public spiritedness, their thrift, their complex economies, and their inordinate love of gain, seems as far removed from a condition of rude nature as does a walled city or a cathedral town.—John Burroughs.

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Northwest Fruit Notes From Here and There

OREGON.

The total apple crop of Oregon for 1920 as estimated by F. L. Kent, Field Agent for the Bureau of Crop Estimates, is now placed at 3,471,000 boxes, so that earlier estimates of 60 per cent of last year's crop for this year still hold good. The report states that owing to the unfavorable weather conditions during the earlier part of the picking season, picking was more expensive than usual, growers paying from 7 to 8 cents a box as compared to pre-war prices of 3 to 4 cents per box.

Prunes packed in cartons with an attractive Oregon label are being shipped to the big Eastern markets by the Phez Company of Salem. It is believed by the company that this form of package will prove very attrac-

tive to prune buyers and that they will find a ready sale.

The Eugene Fruit Growers' Association this year packed out 825,000 pounds of Bartlett pears, more than doubling the pack of last year according to figures recently made public. It is believed that nearly 1,000,000 pounds of pears were packed in the Eugene district this year.

Although handicapped by bad weather harvesting the apple crop of Hood River was completed successfully. Up to the middle of November the Apple Growers Association had received approximately 500,000 boxes and over 200,000 boxes had been delivered to other apple handling concerns.

In The Dalles-Hood River district the Libby, McNeil & Libby Company recently opened the market for canning apples by offering growers \$12 per ton. The company requires that the fruit shall be 2½ inches in diameter or larger.

The Hood River Glacier notes that apples are being shipped out of the Hood River district by parcels post at the rate of a car and a half a week. The bulk of the shipments it is stated go to interior, central and eastern Oregon points and reach their destination on motor stages.

Statistics recently prepared show that Jackson county leads Oregon in pear acreage and stands second in apple acreage. According to the figures given out this county has 5264 acres of bearing pear trees and 2767 acres of non-bearing trees. Douglas county, with 785 acres, has the second largest pear acreage in



The Complete Dormant Spray

—makes vigorous fruit trees

THE FACT that many big commercial orchardists use Scalecide year after year can mean only one thing—that the use of Scalecide pays. These men must protect heavy investments; they must get results. They know every kind of spray material, yet they use Scalecide because it produces results which no other dormant spray can produce.

The invigorating effect of Scalecide is shown in the orchards of Tyson Bros., Flora Dale, Pa., now a part of the American Fruit Growers, Incorporated, where one York Imperial orchard has been sprayed with Scalecide for fifteen years. This orchard, when 18 years old, bore a crop of 30 bushels per tree. This was the tenth consecutive crop, each larger than the preceding.

Scalecide Requires Less Labor

One barrel of Scalecide, which makes 800 gallons of spray, will cover, until they drip, as many trees as three and a half barrels of lime-sulfur, which make 1600 gallons of spray. And of course you can apply 800 gallons of Scalecide with much less labor than 1600 gallons of lime-sulfur.

Scalecide Is Pleasant To Use

Scalecide is soothing, healing and antiseptic to the skin of man or beast, whereas lime-sulfur is caustic and disagreeable. Scalecide does not injure even the eyes. It does not corrode the spray pump nor clog the nozzles, and being an oil, it makes the pump run easier and last longer.

Scalecide kills the hold-over cankers, which cause fire-blight and allows new cambium to form. It kills insects, eggs and larvae of insects, and diseases that winter on the trunk and branches of the tree. It kills the adults and controls Pear Psylla when applied in the Fall or on warm days in the Winter. It controls aphids, too, when applied as a delayed dormant spray.

The invigorating effect of Scalecide is noted in increased terminal growth; larger darker foliage on bearing trees, and the holding of the foliage later in the Fall, thus accumulating starch and sugar, which results in a plumper fruit spur and insures a larger crop the following year. *Scalecide makes vigorous, healthy fruit trees.*

Every Claim Has Been Proved

Every claim we make for Scalecide has been proved in our own large orchards, which now total 26,000 trees, and verified by growers throughout the U. S. We speak to you from 10 years' experience as fruit-growers, and our recommendations are based upon profitable orchard practice.

Avoid Disappointment — Order Scalecide Now

If there is a dealer in your section, ask him to reserve enough Scalecide for you. If there is no agent near you, write for our booklet, prices and guarantee, and give us the name of your dealer. Use the coupon below. Address Dept. 25.

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"Makes a Tree Outgrow Its Troubles"

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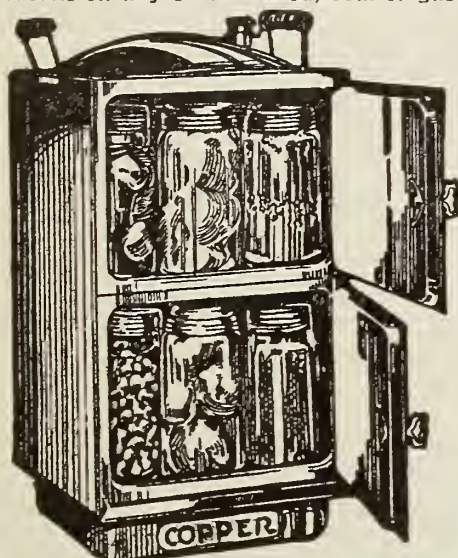
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the state and Hood River is third with 385 acres. In apple acreage Hood River county leads the state with 8,827 acres of bearing apples and 1,619 acres in non-bearing trees.

The commercial club at Oregon City is being urged to take up a campaign there to stimulate the planting of loganberries. The acreage there is now 100 and the suggestion is to bring it up to 500 during the coming year.

The Department of Entomology of the Oregon Agricultural College Experiment Station has recently issued a fruit growers handbook of apple and pear insects compiled by A. L. Lovett and B. B. Fulton. The little volume is full of valuable information for the grower and can be had by application to the college.

Final installation of new machinery in all its packing plants is announced by the Oregon Growers Cooperative Association, with the exception of Scotts Mills where there has been some delay. The new processing machines are of the very latest type, R. C. Paulus, sales manager, announces. They are capable of giving prunes a more thorough washing and they also carry the prunes longer in the steam permitting a higher temperature. During the past season the heaviest packing was done at the Sutherlin and Salem plants on account of delay in shipment of machinery which interfered with operations. The plants already in operation with the new machinery are located at Salem, Dallas and Yamhill. Installation of new machinery is under way in the packing plants at Forest Grove, Myrtle Creek, Dallas, Riddle, and Scotts Mills.

J. O. Holt, packing manager of the Oregon Growers Cooperative Association with headquarters at Eugene, announces that the chemist at the Eugene plant is putting out an apple syrup that is likely to be the real thing. Heretofore, in the apple syrups produced, there was an acid that rather spoiled the effect. By a chemical process, this acid has been removed and syrup made from apples is very likely, within another season, to become popular.

Pear growers who are members of the Oregon Growers Association received the highest prices this season ever known west of the Cascade mountains. On November 1 a car lot of Bosc, grown at Medford, Oregon, topped the New York City market at \$7.38 a box. On November 2, part of another shipment of Bosc pears was sold for \$7.09 a box.

WASHINGTON.

The annual meeting of the Washington State Horticultural Association and Northwest Fruitgrowers Conference will be held in Spokane, December 13 to 17. Other meetings that will be held at the same time will be those of the Washington State Grade and Pack Conference, the Northwest Potato Growers' Conference, the Washington State Beekeepers' Association and the Inland Empire Beekeepers' Association. An interesting program has been prepared for all these events and a general invitation is extended to fruit and potato growers and beekeepers throughout the Northwest to attend.

The Grays Harbor County Berry Growers' Association was recently organized at Satsop, Wash. A constitution and by-laws were adopted for the new organization and the following officers elected: J. W. Strubel, Elma, Wash., president; A. H. Fleming, also of Elma, secretary and treasurer. The plan is to hold meetings in the various towns in the county to secure additional members and to acquaint growers in all sections with the objects and activities of the association.

An apple crop of 13,420,000 bushels is estimated for Washington this year by the U. S. bureau of crop estimates. The 1919 crop aggregated 23,190,000 bushels. Cash buyers are few in number and growers are prejudiced against consigning. Large quantities of apples therefore are going into storage, and there is a general expectation that market conditions will improve when the heavy volume of early fall shipments has been absorbed. Fortunately the country is better equipped for storage than ever before. The Washington pear crop is placed at 532,000 bushels, 71 per cent of normal.

Five hundred seventy-nine cars of Yakima apples rolled to market during the week ending November 13. These shipments bring the record for the season to 6,309 cars, as compared with the 1919 mark of 10,916 cars during the corresponding period. The value of

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D. S. LAKE, President

November 1, 1920

SHENANDOAH, IOWA

this season's output is \$9,000,000. One year ago by this time the growers had received over \$16,000,000. The total Yakima apple crop this season is estimated at 8,000 cars.

When orchardists meet in Spokane this month for the annual grade and pack conference it is stated that Yakima growers will fight to take Jonathans out of the "solid color" class and place them back into the "striped" class. Selah growers voted for a change and elected E. D. Collins, A. F. Guinan and P. W. Cornue as delegates. Selah growers declare that to leave Jonathans in the "solid color" class cuts down profits from that variety as only a few of the apples can be placed in the extra fancy grade.

Two new cold storage warehouses, with a capacity of 2,000 cars of apples, are assured for the Wenatchee Valley as a result of arrangements made by H. G. Bohlke in New York. One warehouse and cold storage plant will be located in Wenatchee and another in Cashmere.

Apple shipments up to November 13 out of the Wenatchee district were 5,400 cars besides 1,017 cars of summer fruit. There is ample storage in the district for all the remaining apples, estimated at about 2,500 cars.

O. D. Webb, a Selah, Wash., fruit grower, writes Better Fruit as follows: "In the November issue of your paper I read a little piece about everbearing strawberries grown in Spokane county so I think it will be of interest to your readers to tell what I have done this year with 4,500 Americus strawberry plants that I set out on the 20th of last March. These plants only cover 100 square rods of ground. From this patch I sold 161 crates and 6 boxes which brought me \$677.55, and average of \$4.20 per crate. The first picking was on July 15 and the last on October 30."

IDAHO.

Over 50,000 boxes of apples are reported to have been harvested in the Stephens orchards near Nampa this year. Some of the leading varieties grown in this big orchard are the Delicious, Jonathan, Stayman, Grimes Golden and Rome Beauty. A study of the production of these varieties over a period of four years by Mr. Stephens shows that the Rome Beauty is the most productive. Mr. Stephens attributes this to the natural vigor of the Rome Beauty tree, its excellent root system and its habit of lengthened late bloom and also to his practice of feeding the land by cutting successive crops of grass and allowing it to lie on the ground. He states that his Rome Beauties have yielded for several years as high as 800 orchard run boxes per acre. In marketing his crop he finds that the Delicious leads in demand and value while the Stayman has proved the best variety for use in February and March.

Prof. E. R. Longley, of the University of Idaho, County Agricultural Agent P. T. Fortner of Payette county, and County Agricultural Agent Guy D. Noel and John Moulton, county farm bureau committeeman of Washington county are cooperating in the study of the life history of the codlin moth in that section in order to compile data on the number of sprayings most desirable. The work will be carried on for at least another year before the conclusion of the investigators will be ready for publication.

With the object of carrying on a general fruit handling business the Valley Warehouse Association has been incorporated at Lewiston, Idaho. The incorporators are F. W. Baker, J. W. Wilkes, J. Florence and H. G. Darwin.

Plans are being completed by the Lewiston district to equip an exhibit train with a complete display of the fruit and other products of that section to be operated through the Middle West.

What They Are Doing in California

This year's raisin crop in California is estimated to be about 175,000 tons of which the California Associated Raisin Co. will handle about 150,000 tons.

A remarkable incident is related in regard to a Los Angeles county apple orchard by H. J. Ryan, county horticultural commissioner, who says that there is in that county a 35-year-old apple orchard sixty acres in extent that has never been sprayed and that has no codling

moth or other insect pests. From the orchard this year 15,000 boxes of fancy grade apples were packed out. According to Mr. Ryan the owner of the orchard posted a notice in his packing house offering a dollar for each and every apple showing injury from codling moth turned in, but has not had to pay out a cent on this account.

Monterey county which has heretofore been almost exclusively devoted to agriculture and dairying is turning its attention to fruit. The climate of the county is stated to be well suited to all varieties of deciduous fruits and nuts and berries and it is stated that many orchard plantings are contemplated there next spring.

The additions that are being made to the plant of the California Almond Growers' Association at Sacramento will make it the largest institution of its kind in the world.

The University of California Fruit Show was held November 18th, 19th and 20th at Berkeley. The exhibit included many fresh fruits as well as a large variety of sun-dried and dehydrated fruits and vegetables.

In showing the benefits of a state inspection service for fruits and vegetables at shipping point the Weekly News Letter of the State Department of Agriculture of California publishes the following:

A car of Tokay grapes was shipped out of the Lodi district on September 18 to a concern in Louisiana at \$2.25 a lub box F. O. B. When the car arrived the shipper received the following wire:

"Tokays here show fully fifteen per cent decay and mold want thirty-five cents allowance answer quick."

The shipper replied that according to the state inspection report the car was in good shape when it left California and the receiver must accept at invoice. The buyer replied:

"Accept car Tokays without allowance mail certificate regarding condition when loaded we will file claim."

If the shipper had not had state inspection on this car he would have had to allow the buyer 35 cents per crate or about \$375.00 on the entire load. On this car alone, therefore, the growers saved enough money to pay for inspection charges on about seventy-five cars.

Bits About Fruit, Fruitmen and Fruit Growing

The announcement that the English maximum price control on apples which was to have gone into effect November 4 has been indefinitely postponed it is stated by apple exporters should be of great aid to apple growers of the Northwest whose exports from now on are expected to be heavy. J. S. Robinson, sales manager of the Earl Fruit Company, in commenting on the new situation, says that American apples should now command a higher price and exportations be increased. Mr. Robinson believes the postponement of the English regulation is a great encouragement to all fruit growers and that the apple business should pick up immediately.

Reports from all parts of the country show that National Apple Day and Week resulted in greatly stimulating consumption and in causing a firmer tone in prices in the big markets of the East. In New York the campaign was carried on along educational lines as well as from a sales point of view. In the public schools 150,000 apples were distributed free and lectures on this history and economics of the fruit given. Joseph H. Steinhardt, who is given credit for starting National Apple Week distributed 150,000 apples to the poor of the city, while from other sources 1,500,000 apples were given to the orphan asylums, hospitals and charitable institutions. Chain stores and wholesale merchants throughout the city took a wide interest in the celebration, as did also many of the theatres, which had streamers advertising the fruit and telling their patrons to eat apples.

If the recommendations of the American Railroad Association through James Menzies, freight traffic manager of the Atlantic Coast Line Railroad in regard to prohibiting the bulge pack on Florida fruits is extended to other sections of the country fruit shippers will be up against a serious proposition. The recommendation states that a great deal of loss occurred last season in handling citrus fruits because the bulge forced the tops of the boxes loose at the ends, spilling the fruit on the floor of the car. A strong protest has been made by the Florida Citrus Fruitgrowers Exchange against eliminating the bulge pack and the

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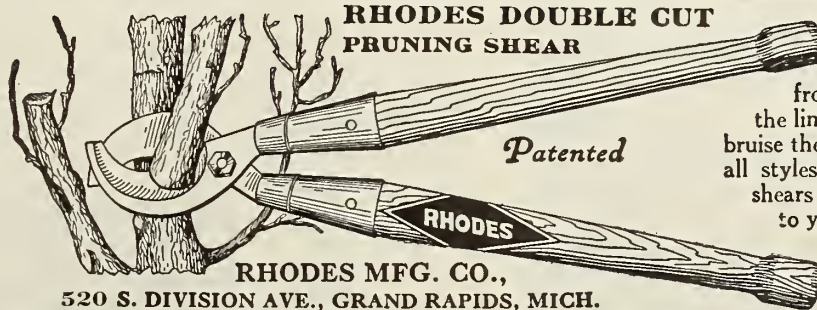
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matter is now up for a reconsideration by the railroads entering Florida.

The tenth Indiana apple show was held at Indianapolis, November 15, with what is said to be the largest and best fruit exhibit ever held in the central West. There were displays from nearly every state in the middle region, and the leading orchard men were united in putting forth a great effort to bring a closer cooperation among the fruit growers of this section. The crowning feature which held the center of interest, and attracted the growers was the prize of \$300 offered for the best barrel of Stark's Delicious. A prize of \$250 was offered for the best box of this variety, and \$50 for the best plate. The exhibits of this brand were exceptional, and the competition for the prize money was very keen. In addition to the apple displays a full line of spraying machinery and materials, pruning tools, ladders and other orchard equipment were shown.

Cannery Notes

The formation of a five-million dollar corporation for the manufacture of machinery for cannery and dried fruit packers is announced by the Berger and Carter Company interests of San Francisco. The new company will be

known as the Berger, Fleming and Brown Co., and will have its main offices and factories at San Jose.

The new corporation absorbs the following companies: B. & C. Machinery Co., Hayward, California, manufacturers of fruit and vegetable canning machinery; Smith Manufacturing Company, San Jose, California, manufacturers of machinery and equipment for packers of dried fruit; Wonder Dehydrator Company, San Francisco, California, manufacturers of "Wonder" Portable and Custom Dehydrators operating under the Hammond Process Patents; Natinoal Axle Corporation, San Jose, California, manufacturers of auto truck axles. The factory equipment of the B. & C. Machinery Co. will be moved to the plant of the Smith Manufacturing Company, while a new unit to be added to the National Axle Corporation plant will take care of the building of dehydrators.

The officers of the Berger, Fleming and Brown Co. are Otto A. Berger, chairman of the board of directors, W. W. Fleming, president and general manager, and E. W. Brown, vice-president and treasurer. Otto A. Berger is president and chairman of the board of directors of the Berger and Carter Company, San Francisco, W. W. Fleming, vice-president and secretary and E. W. Brown, treasurer.

Apple Scald—Its Cause and Prevention

Delivered Before the International Apple Shippers' Convention by Charles Brooks

WE HAVE been trying to find out more about apple scald, why it occurs and how it can be prevented. One of the things that makes the disease puzzling is that cause and effect are often so far removed that it is easy to overlook the connection. Scald makes its most rapid development just after the apples are brought out of storage and it would be natural to conclude that the shock resulting from the sudden change of temperature is responsible for the trouble. But instead of being traceable to any such near at hand condition the cause runs much further back in the life of the apple; back to the operation of the storage house, to the condition of transportation, to the methods used in the packing house, the kind of package, the time of picking and even to orchard and weather conditions.

These different factors are not equally responsible for the occurrence of scald yet any one of them or all of them may play a part in producing it. Where so many agencies are concerned it naturally raises the question of relative responsibility and when apples come out of storage with an unusual amount of scald next to the question of how to dispose of the fruit is that of why did it happen and who is to blame.

The time of picking and packing the fruit is one at which ownership and responsibility often shift and we may make this a dividing point in considering the different factors concerned in the production of apple scald. We will turn first to the orchard side of the problem and consider the scald determining factors inherent in the fruit when picked. The most important of these is the maturity and in fact the most generally recognized method of scald prevention in the past has been that of picking the fruit at proper maturity. Well matured apples scald less than green ones and highly colored fruit scalds less than poorly colored fruit. When the trees have been pruned so as to let in the sunlight and the apples left on the tree till well ma-

tured a great deal has been accomplished in the way of scald prevention. The remedy is a valuable one and should be used to the greatest extent possible yet we should not overlook the fact that at best it is very incomplete. Even in the irrigated sections where there is almost constant sunlight some of the apples will of necessity be poorly colored and in fact most of them have a green side or greener areas of some sort that serve as vulnerable points for scald. In the non-irrigated sections, comprising the larger part of the apple producing area of the country, the growers are far more at the mercy of weather conditions. There may be weeks of cloudy rainy weather in the fall that make it impossible to secure color and impractical to delay picking. Even in the most favorable seasons and with a reasonable degree of care a large part of the fruit must of necessity go into storage in a condition that makes it fairly susceptible to scald. The fact that the remedy is not complete does not, however, justify overlooking it and every possible effort should be made to have the fruit come from the tree in a well colored and well matured condition.

In this connection it perhaps should be mentioned that green apples do not scald more quickly than ripe ones. The fact that green apples scald worse than ripe ones has sometimes led to the in-

ference that they scald sooner but frequent examinations of fruit where the green and ripe apples are stored together will convince one that this is not true. The riper apples that scald at all develop the disease before the green ones but if the fruit is held in storage until the green ones become scalded they are then far more seriously affected than the ripe ones.

Another orchard condition that has a bearing on the scald problem is the amount of irrigation or rainfall late in the season. Apples that are forced into rapid growth late in the year by excessive soil moisture are more sus-

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ceptible to scald than those receiving a more moderate water supply and also more susceptible than those that have made a more even growth throughout the season. In general large apples scald earlier and more seriously than small ones yet the question of size is closely tied up with the orchard conditions that produce the size and it is often the forcing the apples have received late in the season rather than the largeness of the fruit that is really responsible for the increased susceptibility to scald.

Another orchard condition that has an influence upon the susceptibility of the fruit to scald is the occurrence of disease. Apples that have been russeted by powdery mildew are more susceptible to scald than those that are free from it, but in general fruit from diseased trees is more resistant to scald than that from healthy ones. The most striking example of increased resistance to scald through the presence of an orchard disease is found in the case of cedar rust. York Imperial apples from trees that have suffered from a severe attack of cedar rust will remain free from scald four to eight weeks longer than apples from similar York Imperial trees that have been free from the disease.

The inherent susceptibility to scald that the apple carries with it at picking time is then an extremely variable characteristic dependent upon the various orchard conditions that prevailed throughout the season. A failure to give due consideration to the quality of fruit at this time might result in blaming the cold storage management for the spoilage of apples that really could hardly have been made to keep or possibly in some cases to giving him credit for keeping fruit that could hardly have been made to spoil.

But turning to the other side of the question and taking the fruit as it comes from the tree: What can still be done to extend the storage life of the scald susceptible varieties? In considering this phase of the subject it should be borne in mind that the apple as it goes into storage is still a living organism carrying on various complex life activities. It is continually giving off moisture and also odorous substances and it is carrying on a respiration similar to that of man—taking up oxygen and giving off carbon dioxide. These life processes can not and should not be stopped but the more slowly they can be made to act the longer the apple will live and the longer it will keep its good qualities. The most satisfactory and the almost universal method of slowing down plant activities is to lower the temperature and building on this principle we have developed in comparatively recent years our enormous system of refrigerator cars and cold storage plants. The apple has claimed its share of space in all this development and as a result the apple market and the apple season have been greatly extended and the quality of the fruit improved. But along with the development of our modern storage methods apple scald has come to the

front as one of our most serious apple diseases. The apple rots appear to have been with us always but apple scald is essentially a modern disease. This coincident development of the new disease and the modern storage has naturally led many to suspect some cause and effect relationship. Powell and Fulton of the U. S. Department of Agriculture investigated the question some 17 years ago and reported that they found no indication that cold storage temperatures favored the development of scald but rather that they retarded it. The cold storage companies have insisted that it was the delay in reaching storage rather than what happened in storage that was responsible for the trouble. But on the other hand it has often been found that apples stored in cellars or in air-cooled plants have come out of storage perhaps riper but with far less scald than those held in commercial cold storage. We decided to go over the subject very carefully, covering a wide range of temperatures so that we might get not only the immediately practical side but also the principle of scald development. We carried on the work for three consecutive years and included practically all of the scald susceptible commercial varieties in our tests. The results were consistent throughout. Varieties like Grimes scalded one to four weeks earlier than York Imperial or Black Twig, but in general apples held at 60° or 70° scalded three or four weeks earlier than those at 50°; those at 50° four weeks earlier than those at 40°; those at 40° about three weeks earlier than those at 32°, and those at 36° also earlier than those at 32°. Between 60° and 32° each drop of 10 degrees meant a delay of three to four weeks in the time that scald would appear. The higher temperatures tested are, of course, out of the range of storage practices but they are not higher than those the apple is compelled to tolerate in delayed storage. We have found that a week to ten days delay in a warm packing house or in an unrefrigerated car results in two to three times as much scald on the delayed fruit as on that stored immediately at 32° and that the scald appears three to five weeks earlier on the delayed fruit.

The period immediately following the removal of the fruit from the tree is a time when refrigeration is most seriously needed and while 32° is the most desirable temperature it should not be overlooked that every degree of cooling is valuable.

One of the interesting things that developed in our temperature studies was the fact that at temperatures above 40° scald becomes evident as it is produced but that at 32° it does not. Apples held constantly at 32° may be badly scalded for months without showing any sign of the trouble but given a day or two in the warm air and they will go all to pieces. The abnormal diseased condition of the skin may develop at 32° but the temperature is too low for the death and spoilage processes to be completed. In the average commercial storage plant where the doors are open

almost every day the apples usually get enough gusts of warm air to develop evident traces of scald but in rooms that are little disturbed the potentially scalded apples show no sign of their actually diseased condition. This peculiarity of apple scald makes it a very deceptive disease and one that is capable of causing serious misunderstanding.



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Sonderegger's Golden Sweet Corn. If you like a yellow one, do not fail to try this. Contains about 5% more sugar and 5% less starch than the early white varieties, making it better for table use. It has been called "the sweetest corn in the world."

Sonderegger's Prizetaker Onion is the largest and handsomest Yellow Globe onion. Reaches an immense size and commands a high price. Delicate flavor.

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 80 Court St. (10) Beatrice, Neb.

Seeds and Trees That Grow

ings in the trade. Apples may appear to be in most excellent condition when removed from storage and loaded for shipment and yet if they should encounter a day or two of warm weather in transit, arrive at their destination in a practically worthless condition. Troubles like this are likely to be particu-

larly serious in after-storage shipments to southern markets.

With the prevailing cool weather in the more northern markets scalded apples can usually be disposed of before the disease has had time to become seriously evident. At least they can be passed along to the consumer and if he

eats them or cooks them at once everybody is satisfied. But if he holds them a few days for table use and finds that his good apples of today look like rotten ones tomorrow he is not left in a frame of mind to repeat his order or to do his part in apple consumption. The farther south the market the more serious is the difficulty of handling scalded apples. The larger amount of scald is not due to any shock resulting from bringing the fruit directly into warmer temperatures but merely to the fact that the higher temperatures allow the scald that is already present to become evident before the fruit can be sold.

Along with the temperature work the effects of ventilation and aeration were tested and the results were most surprising. We found that we could entirely prevent scald on any variety and at any temperature either high or low by giving the fruit fresh air. This threw a new light on the nature of the disease; it was apparently due to some condition in the air that was produced by the apples themselves. It also offered promise of a practical solution of the problem by means of ventilation. Our first tests were made in our own small refrigeration plant and for the past three years we have been carrying on aeration and ventilation experiments in various commercial storage plants. Under commercial conditions the great difficulty is to really secure an aeration that will reach the apples themselves. In the cold storage room everything is conducive to air stagnation. The rooms are stacked as full as possible and everything stands at practically one temperature. There is nothing in the general nature of things to start the air in motion and it seems practically impossible to do so with any efficiency by resorting to special equipment. Fans send a current down the aisles but the air back in the stacks is little disturbed. Where the rooms are cooled by the air circulation or bunker system there is a very slight breeze across the top of the room but it seems to have little effect upon the mass of the storage air. If windows are thrown open it is usually done when the temperature outside is practically the same as that inside and unless there is a strong wind prevailing in the proper direction the air in the storage room is but little affected. All of these things have been tested as to their effects upon scald and in spite of the very slight aeration secured all have been found to be of some value especially to the more exposed fruit.

(To be concluded in January number.)

Nitrate of soda applied to the soil at the rate of 5 pounds per prune tree, according to the Oregon Agricultural College, resulted in an increase of one-third the untreated crop in one Oregon orchard last year. Beneficial results both in the tree growth and fruitfulness were obtained in almost every trial in the Oakland sandy loam, the Lookingglass light hill soil and The Dalles reddish hill soil.

B. T. S.

DRY POWDERED

BARIUM-SULPHUR COMPOUND

PATENTED APRIL 23, 1918

B. T. S. is a definite chemical compound of sulphur with barium in which all of the sulphur and all of the barium are available as active ingredients. Although barium belongs to the same chemical group as calcium (or lime), it possesses in addition certain properties which when combined with sulphur greatly increase the efficiency of both materials, rendering the compound remarkably effective in killing scale insects. Barium sulphur compounds possess a stability that cannot be secured in dry compounds of either lime or soda with sulphur. This means that B. T. S. has the advantage of being more dependable as a spray, and less liable to cause serious injury to plants.

It dissolves readily in cold water. By the elimination of the water and reducing to dryness, the weight in shipping is reduced about 80% as compared with lime-sulphur solution, loss from leakage is eliminated, and transportation costs are cut to a minimum.

B. T. S. may be substituted for lime-sulphur solution in all spraying operations, in both dormant and growing period applications on deciduous and citrus trees.

Growers who have used B. T. S. have found it in all respects equal in efficiency to the solution, and owing to the greater convenience of handling, prefer it to the more bulky and inconvenient liquid.

Our interests are the same as yours. Write us about your tree troubles, and ask for Bulletin No. 3 on Dormant Spraying of Deciduous Fruit Trees.



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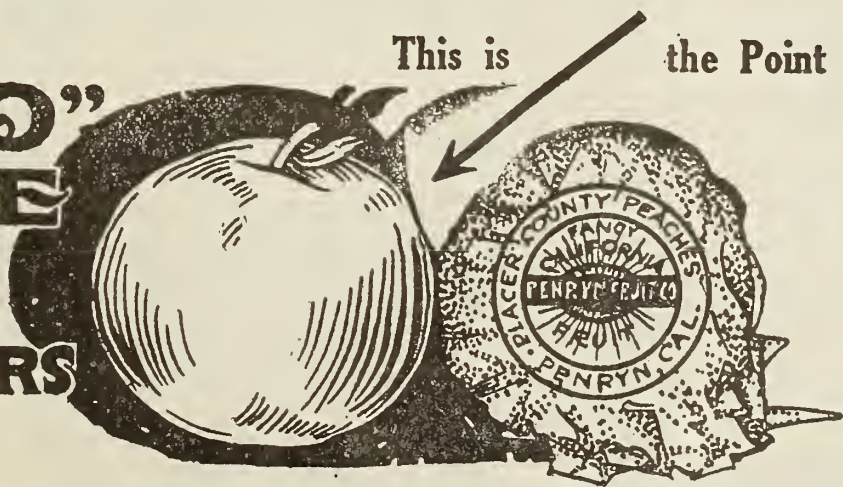
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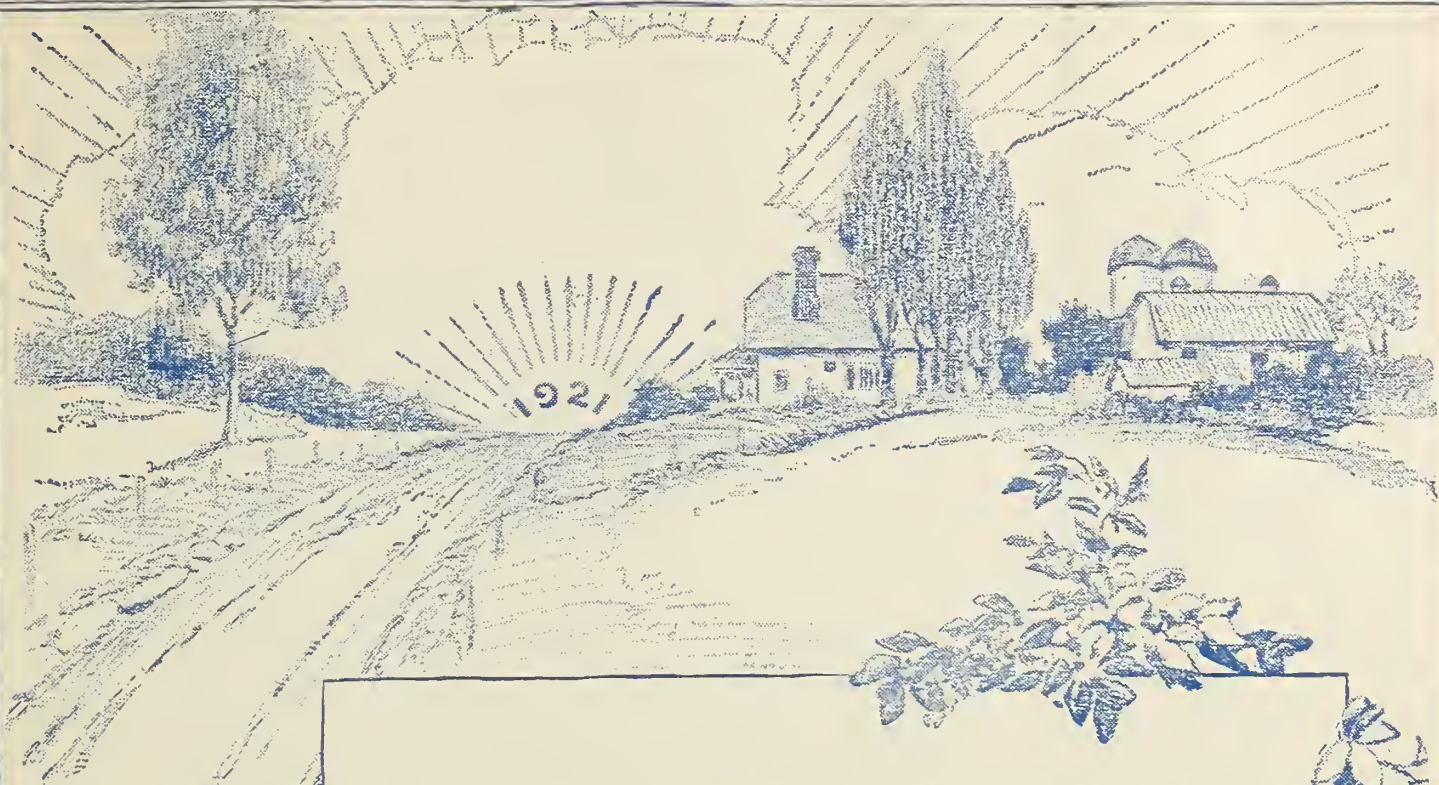
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Over Another Threshold

SOON you will put the calendars of a new year up on your walls. You have weathered the labors of the past four seasons—with what benefits and damages you recall full well. Now the cycle of a new year looms ahead, and we must prepare to gather the fruits of 1921.

It is a time when conservative manufacturing enterprises and business houses are reviewing the past, taking stock of resources, and building future campaigns. Leaks are stopped, needs are reckoned with, and plans are made with extreme care.

Winter is the best time in most sections for complete farm inventory, for overhauling machines and making repairs, for accurate reckoning of profit and loss, for planning crop changes, for discarding old habits and considering new methods.

Every farmer knows this. It is good to see that there is more and more definite planning of full year's work at the close of every December, on the farms of America. It is so easy a matter to slide through the comparative resting period of Winter, and then Spring with its hundred duties bursts forth and finds many important matters and details unattended to.

We are glad to note this trend toward business-farming because we hope to be allied with Agriculture many more years and because our interests are so closely mingled with the interests of the farming world. So then, while we are setting our own house in order for 1921, we pause to publish the hope that you, the reader, may set forth into a new year of farming enterprise with all plans laid for a most profitable twelve-month.

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